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$\frac{2}{2}$,[1] and where the second superior true molar is wanting. But one specimen of the *C. gibbus* possessed the second superior true molar. The species may be called *Dysodus gibbus*. It differs from the Japanese spaniel (*D. pravus* Cope) in its elongate muzzle, and in the great sparseness or absence of hair, in its erect ears, and in various other respects.

The characters of these genera are as well marked as those of non-domesticated forms of Canidæ. The deficiencies of dentition, although concomitants of reduced size, are not caused by it, since a majority of the extinct Canidæ, which preserve with great constancy the characters wanting in Synagodus and Dysodus, are of equal and smaller size.

I have had a female Japanese spaniel in my possession for eight years, and she has had pups several times. With one exception they never lived to be more than a few months old, and were of very erratic mental constitution. They displayed a great deal of ferocity in their family relations, nearly killing each other on several occasions. They nearly all died of convulsions.—*E. D. Cope.*

EMBRYOLOGY.[2]

The Rudimentary Pineal Eye of Chelonians.—In the *Quar. Jour. of Micr. Sci.* for October, 1886, W. Baldwin Spencer describes very fully the presence and structure of the pineal eye in Lacertilia, but makes no mention of its occurrence in any of the Chelonia. The other day, while looking over some sections prepared by the writer from an embryo of *Chrysemys picta*, presented by Dr. C. S. Dolley, Prof. J. A. Ryder called my attention to an organ which he took to be the pineal eye. Subsequent investigation showed this to be the case.

The embryo first cut was one measuring three-quarters of an inch from the tip of its nose to the end of the tail. The sections were made in a vertical longitudinal direction, and in the median line the structure referred to was found. The pineal outgrowth lies just behind the fore-brain; the proximal part of its stalk is tubular, while the distal end is flattened from above. It curves towards the tip of the snout, and its lower surface faces the inner margins of the cerebral hemispheres.

The eye occurs as a hollow vertical evagination from the upper surface of the pineal outgrowth, and leaves the stalk of the latter at the beginning of its distal fourth, measuring from its rear end. The two together, the eye and the pineal body, resemble very much in longisection the outline, as seen from the side, of the hammer of a gun.

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[1] Naturalist, 1881, p. 233, where the dental characters of eight specimens are described.

[2] Edited by JOHN A. RYDER, Ph.D., Biological Department, University of Pennsylvania, Philadelphia.

Approaching the eye from without inward, one finds first the epidermis of the skin, then the corium, then a few irregularly-branched connective-tissue cells, the pia, and, finally, the outer surface of the eye. Surrounding it like a collar is a blood-sinus, which even after two or three years' preservation in alcohol was still filled with corpuscles, whose nuclei came out very sharply on staining in borax carmine.

The cells composing the eye are distinctly columnar throughout, with well-marked nuclei. The eye is balloon-shaped, or pyriform, and the cells on the upper half point towards the centre, while the remainder point towards the long axis of its short stalk. There is some fine thread-like or stringy material in the cavity of the eye which does not take the stain, and which is probably the coagulated remains of some serum or plasma which filled the cavity.

On looking at the upper surface of the head in other unstained, alcoholic, specimens of *Chrysemys picta*, there is no external evidence of the presence of this unpaired organ. In fact, the pineal eye in this type is evidently in a rudimentary condition; possibly in process of degeneration. No part of the outer wall of the optic vesicle of the pineal eye shows evidence of thickening into a lens, such as is found in that situation in many Lacertilia. It approximates, with its hollow stalk, somewhat towards the condition of *Cyclodus*, as described by Spencer, but there is no pigment developed anywhere in the pineal eye of *Chrysemys*.

However, in one specimen of unhatched *Cinosternum pennsylvanicum*, which, through Professor Ryder's kindness, I have had the privilege of examining, there is seen in the median line, half-way between the snout and the front end of the carapax, a clearly defined brownish pigment-spot. Judging from analogy and comparing my results with those of Mr. Spencer, we may expect to find the eye in this species much more highly developed than is the case in *Chrysemys* described above.

These observations are also of greater interest because of the fact that none of the Chelonians, in the adult condition, as far as I am aware, have a parietal foramen developed, such as is found in many Lacertilians. It is therefore clear that the pineal eye in Chelonians cannot at any time during life attain to even the functional importance of that organ in any of the Lizards in which it has hitherto been observed.—*George Fetterolf, Biological Laboratory, University of Pennsylvania*, November 9, 1887.

PSYCHOLOGY.

The Theology of Evolution.[1]—In the pamphlet bearing the above title is contained a statement of the evidence in favor of primitive and creative mind in nature, brought to light by the

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[1] The Theology of Evolution, a lecture, by E. D. Cope; A Review of the Theology of Evolution, a reply to Dr. Montgomery, by E. D. Cope; The Relation of Mind to Matter, by E. D. Cope; all, 1887, Philadelphia, Arnold and Company.